

Notes - Finding Solutions by Graphing

Solutions = x-intercepts (where the graph crosses the x-axis)

They are also called roots or

Zeros because they happen where $y=0$.

Example of finding solutions by graphing:

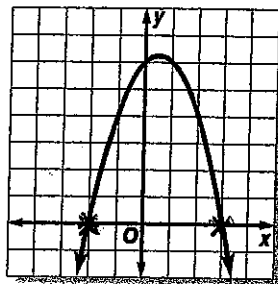
The graph of the quadratic function $f(x) = -x^2 + x + 6$ is shown at the right. Use the graph to find the solutions of the quadratic equation $-x^2 + x + 6 = 0$.

Just find the x-intercepts!

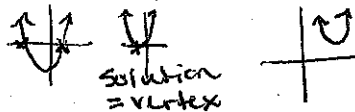
The solutions are $(-2, 0)$ and $(3, 0)$

You could also write this as $x = -2, 3$

but NOT $(-2, 3)$

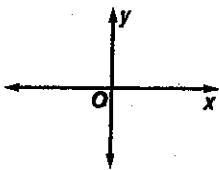


■ Quadratic functions can have 2, 1, or no real solutions

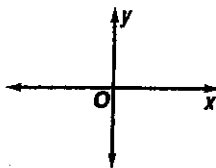


Sketch a graph to illustrate each situation.

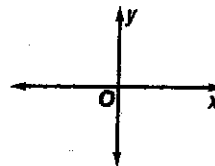
- a. A parabola that opens downward and represents a quadratic function with two real zeros, both of which are negative numbers.



- b. A parabola that opens upward and represents a quadratic function with exactly one real zero. The zero is a positive number.



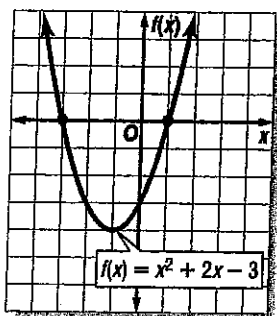
- c. A parabola that opens downward and represents a quadratic function with no real zeros.



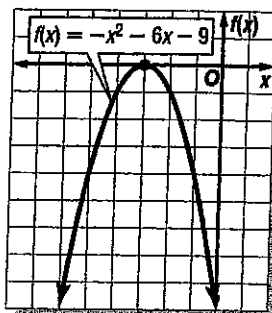
Solving Quadratic Equations By Graphing

Use the related graph of each equation to determine its solutions.

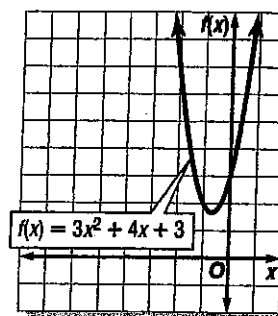
1. $x^2 + 2x - 3 = 0$



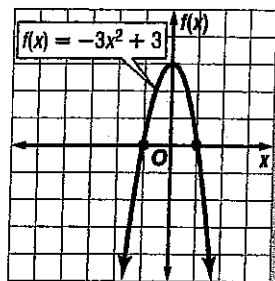
2. $-x^2 - 6x - 9 = 0$



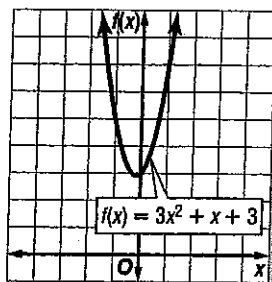
3. $3x^2 + 4x + 3 = 0$



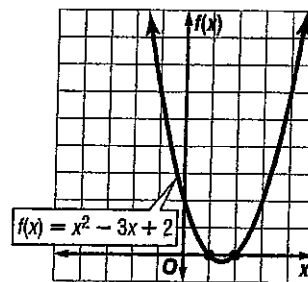
4. $-3x^2 + 3 = 0$



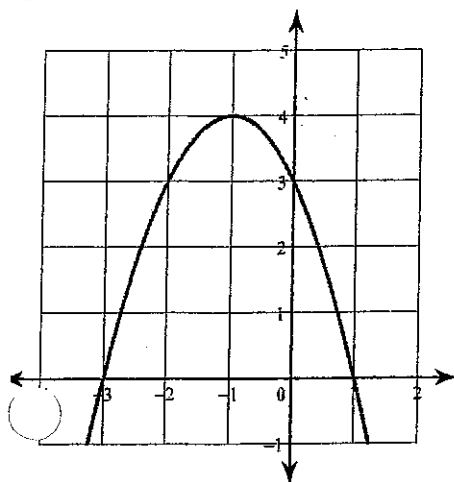
5. $3x^2 + x + 3 = 0$



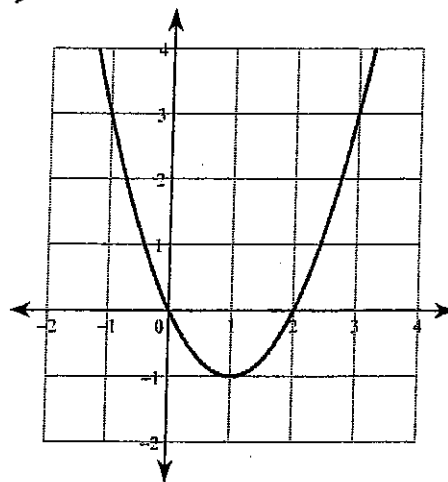
6. $x^2 - 3x + 2 = 0$



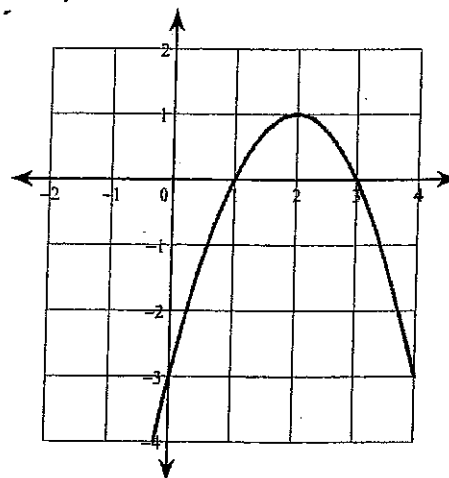
7.



8.



9.



Using the Calculator to find solutions by graphing

- If the function doesn't have neat, tidy integer value solutions, then you need to find the exact solutions with your calculator.

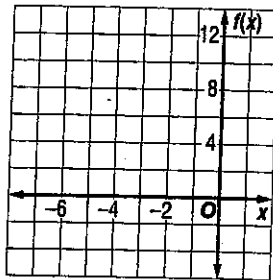
Steps

- ① Plug the equation into $Y=$
- ② Make sure that you can see the solution(s) and change your WINDOW if necessary.
- ③ Go to 2nd TRACE (the Calculate screen)
- ④ Choose 2: zero
- ⑤ Move the blinky to the left of the solution you're trying to find and press enter. (Left Bound?)
- ⑥ Move the blinky to the right of the solution you're trying to find and press enter. (Right Bound?)
- ⑦ Move the blinky to where you think the solution is and press enter (Guess?)
Ta-da! The zero ($x = y = 0$) appears at the bottom.
- ⑧ If you need to find more than one solution, repeat steps 3-7.

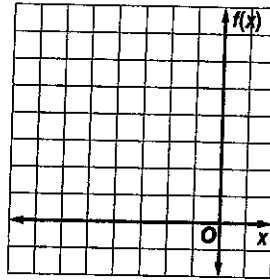
Use calculator to graph
and find the exact solutions.

Solve each equation by graphing.

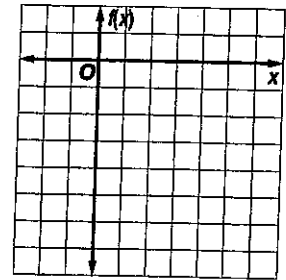
10. $-2x^2 - 6x + 5 = 0$



11. $x^2 + 10x + 24 = 0$

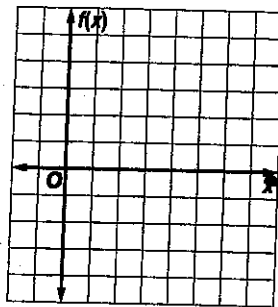


12. $2x^2 - x - 6 = 0$

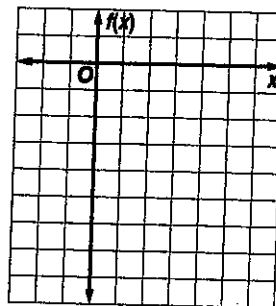


Solutions (, 0)
and (, 0)

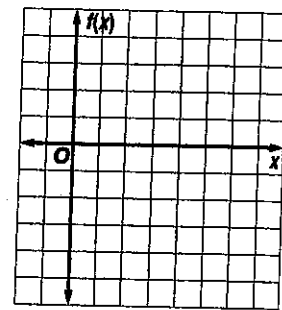
13. $x^2 - 6x + 5 = 0$



14. $-x^2 + 2x - 4 = 0$

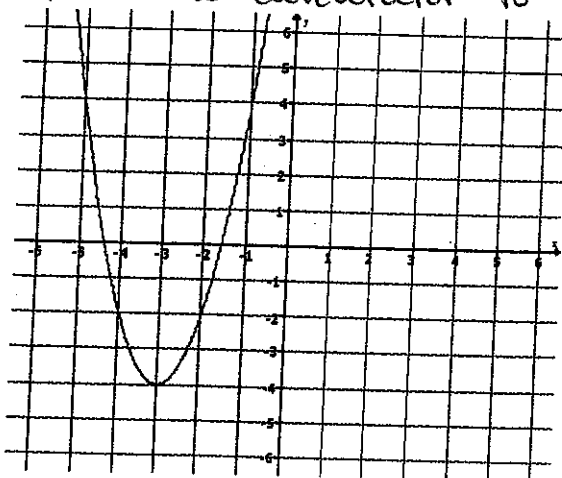


15. $x^2 - 6x + 4 = 0$

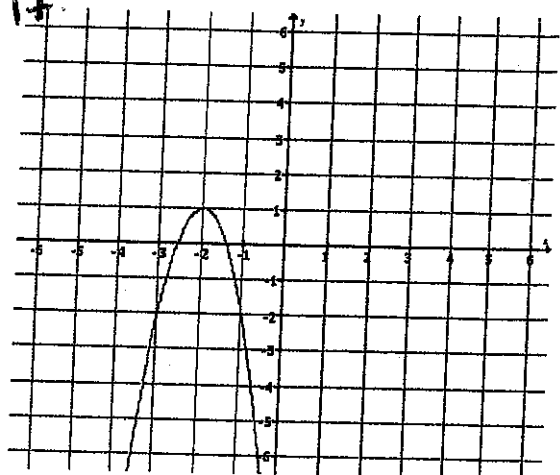


Write the equation from the graph, then put the equation
into the calculator to find the exact solutions.

16.



17.



Equations: $y =$ _____

$y =$ _____